Remittances and Economic Growth:
Larger Impacts in Smaller Countries?

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Abstract

Small Island Developing States (SIDS) face considerable development challenges. In particular, their small domestic markets and limited employment opportunities imply a greater need for migration and a heavier reliance on remittances relative to other developing countries. This paper examines the impact of remittances on economic growth in SIDS. Results from the estimation of a number of variants of an empirical model suggest that while, there is on average no association between remittances and growth in developing countries, there is a positive association in SIDS. This finding holds for SIDS located in sub-Saharan Africa and the Pacific but not for those located in Latin America and the Caribbean. The paper presents evidence of negative growth in the absence of remittance receipts in Pacific SIDS.

I. Introduction

Remittances are an important source of foreign income for developing countries, increasing dramatically in size over recent decades. Developing country remittance receipts were $US0.3 billion in 1971. These receipts are expected to reach $US350 billion in 2011, up from $US320 in the previous year. Remittances now account for more than two and a half times the global level of Official Development Assistance (ODA) having accounted for less than five percent of the level of ODA in 1971 (World Bank, 2011a, 2011b).[1] They flow directly to households rather than governments, which can be advantageous, can serve as a de facto social safety net in difficult times and can offset macroeconomic volatility.

It is not surprising, therefore, that there is a large and growing research literature on the economic impacts of remittances in developing countries. A number of empirical studies have looked at the impact of remittance inflows on the economic growth rates of these countries. Chami *et al.* (2003), IMF (2005) and Barajas *et al.* (2009) find a zero or negative association between remittances and growth. Catrinescu *et al.* (2009), Jongwanich (2007) and Pradhan *et al.* (2008) find some evidence of a positive association while other studies find the impact varies according to a country's educational attainment, financial market depth and quality of institutions (Giuliano and Ruiz-Arranz, 2009; World Bank, 2006; Ramirez and Sharma, 2008). Other studies have examined impacts of remittance inflows on known drivers of growth. Hildebrandt and McKenzie (2005), Lopez-Cordova (2006), Acosta *et al.* (2008) looked at impacts on human capital, Aggarwal *et al.* (2011) and Demirgüç-Kunt *et al.*, 2011) were concerned with impacts on financial development, Chami *et al.* (2003) and Jackman *et al.* (2009) examined impacts on investment volatility and Amuedo-Dorantes and Pozo (2004) investigated the impacts on the real exchange rate.[2] Evidence of positive impacts from these studies is mixed.

What is surprising is that there have been no empirical studies of the impact of remittances on economic growth in countries belonging to the Small Island Developing States (SIDS) group.[3] It is in these countries that remittances are likely to have the largest economic impacts, good or bad.[4] SIDS receive much larger remittance inflows relative to the size of their economies than any other country group. During the 2000 to 2009 they received

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[1] Descriptive data on remittances are provided in Appendix Figure A1 and Table A1.
[2] A number of studies have also looked at the impact of remittance inflows on poverty. See, for example, Adams and Page (2005) and Brown and Jiminez (2005).
[3] Amuedo-Dorantes *et al.* (2010) look at relationships between remittances, the exchange rate, natural disasters and development aid in SIDs, while Brown and Jimenez (2008) look at the impact of remittances on income poverty and income inequality in two Pacific SIDs, Fiji and Tonga. Connell and Brown (2005) provide an overview of remittances to the Pacific Island countries.
[4] The United Nations classifies 52 countries as SIDS. A list can be found in UN (2012).

remittances that were the equivalent of 7.2 percent of their GDP, compared to 1.8 percent for the developing country group as a whole over the same period. SIDS located in the Pacific region received remittances that were equivalent of ten percent of GDP during 200o to 2009 (World Bank, 2011b). Among SIDS it is not uncommon for remittances to account for more than 20 percent of country GDP and for as many as 90 percent of households to receive remittances from abroad (World Bank, 2011b and AusAID, 2009). The size of these flows, combined with the mixed messages coming from existing studies as to whether they have beneficial impacts, provide a compelling justification for examining the impact of remittances on economic growth in SIDS.

The absence of research on the impact of remittances on growth in SIDS is even more surprising given the economic challenges these countries face and the lofty expectations of the role that remittances can play in dealing with these challenges. Despite their diversity, SIDS are generally by characterised by high vulnerability to external shocks and natural disasters, a dependence on imports, a narrow production base with limited exports, low levels of institutional capacity and remoteness to international markets. The small sizes of their domestic markets prevents them from taking advantage of economies of scale and limits local employment opportunities. Given these characteristics it comes are no surprise economic growth rates are on average lower and more volatile among SIDS than all other developing countries (Briguglio, 1995, Briguglio *et al.* 2006 and McGillivray *et al.*, 2010). Remittances are widely considered as crucial to the future economic prosperity of most SIDS. Developed country governments and multilateral development agencies call for higher levels of remittances to SIDS and actively work with their governments to achieve this through a variety of measures. Given seriousness of the challenges faced by SIDS, and this response, it is imperative that information on the impact of remittances on growth in these countries be provided. Is the emphasis on remittances to SIDS appropriate? Would economic growth in SIDS be higher, lower or roughly the same in the absence of remittances to them?

Such is the focus of this paper. Using panel data for 209 countries spanning the period 1971 to 2010, this paper provides an econometric analysis of the impact of remittances on economic growth in SIDS. Included in this sample are 25 SIDS. This analysis tests whether this impact is different in SIDS than in other developing countries. The paper finds that remittances have a positive impact on growth in SIDS, but not in other countries. It does, however, find that the result differs among different groups of SIDS, holding for those in the Pacific and sub-Saharan Africa, but not for those located in Latin America and the Caribbean.

The remainder of this paper is structured as follows. Section II outlines an econometric model of remittances and growth that delineates the remittance inflow impact in SIDS from other developing countries. Section III discusses the data and econometric methods used to estimate the parameters of this model. Section IV presents the estimation results and provides and an interpretation of them. Section V concludes, considering implications for policy and, in particular, future research.

II. An Econometric Model of Remittances and Growth

The literature identifies a number of channels through which remittances can influence economic growth. Remittances can promote this growth by providing additional foreign exchange and financing business investment (Amuedo-Dorantes and Pozo, 2006, Woodruff and Zenteno, 2007). They can also improve human capital by increasing resources for health and education (Edwards and Ureta, 2003, Gitter and Barham, 2007, Amuedo-Dorantes *et al.*, 2008). Remittances can also reduce domestic macroeconomic volatility, thereby encouraging greater domestic investment (see Barajas *et al.*, 2009). Conversely, remittances will have a limited impact on growth if they are spent on consumption rather than investment. They can potentially be associated with lower growth by inducing a real exchange rate appreciation. Since remittances directly supplement household income, they could also reduce domestic output and growth by reducing labour effort and supply. Each of these impacts is potentially applicable to SIDS and their relative magnitudes are unknown. What the overall impact of remittances on growth is, therefore, an empirical matter, to which we now turn.

The econometric model used by recent empirical studies of the impact of remittances on economic growth may be written as follows:

$$g_{i,t} = \alpha + \beta r_{i,t} + \phi' z_{i,t} + \mu_{i,t} \qquad i = 1,...,n \qquad (1)$$

where $g_{i,t}$ is growth of real GDP per capita in country i in period t, $r_{i,t}$ is a measure of remittances received by i expressed as a percentage of its GDP in period t, $z_{i,t}$ is a vector of control variables relating to i in period t, $\mu_{i,t}$ is a residual, α is a constant (or intercept) term, β is a (slope) coefficient and ϕ' is a vector of coefficients. Recent studies have estimated (1) using panel data from large, heterogeneous samples of developing countries. There are sufficient data to estimate (1) using a sample of SIDS, but this would invoke a standard sample selection problem in which the characteristics that determine SIDS membership may well be correlated with the unobservable determinants of their economic growth. This is a problem in that it will bias the estimates of β and of the elements of Φ. An alternative approach is to construct a large, heterogeneous dataset for a sample that includes as many

SIDS for which data are available and use this dataset to estimate the following equation, an augmentation of (1):

$$g_{i,t} = \alpha + \beta r_{i,t} + \phi' z_{i,t} + \delta r_{i,t} \square s_i + \pi s_i + \nu_{i,t} \qquad i = 1,...,k, k+1,...,n \qquad (2)$$

s_i is a binary (0,1) dummy taking the value of unity if i belongs to the SIDS group of countries (sub group $i = 1, ..., k$) or zero for all other countries ($i = k+1, ..., n$), $r_{i,t} \bullet s_i$ is a multiplicative interaction between this dummy and the remittances variable defined below and δ is a coefficient. For all i for which s_i equals unity, (2) reduces to

$$g_{i,t} = \alpha + \pi + (\beta + \delta) r_{i,t} + \phi' z_{i,t} + \mu_{i,t} \qquad i = 1,...,k \qquad (2a)$$

and to (1) for all other countries ($i = k+1, ..., n$). It follows that for the purpose of this paper δ is the key parameter, as it shows the difference in the incremental impact of remittances on economic growth between SIDS and all other developing countries. From (2a) it is evident that π shows the difference in intercepts between SIDS and non-SIDS.

Let us now consider the definition and selection of variables, commencing with the remittances variable, $r_{i,t}$. Remittances are typically defined as unrequited transfers sent by foreign workers to their home countries. There are three components that are generally accepted as constituting remittances: worker's remittances, compensation of employees, and migrants' transfers. Workers' remittances are classified as current private transfers from migrant workers resident in the host country for more than a year, irrespective of their immigration status, to recipients in their country of origin. If a migrant worker lives in the host country for less than a year, his or her entire income in the host country should be classified as compensation of employees. Migrants' transfers are defined as the value of financial items of individuals that arise from migrating to another country.[5] Following recent studies of remittances (Pradhan *et al.*, 2008; Mundaca, 2009; Rao and Hassan, 2011), we adopt this definition, with $r_{i,t}$ being the sum of workers' remittances and compensation of employees received in country i as a percentage of its GDP in year t.

The selection of elements of the control vector of variables is guided by the existing literature, but also a desire to include in the sample as many SIDS as feasible, noting that the availability of data for these countries is a particularly limiting factor even by developing country standards. Six main control variables were initially selected. To these variables a number of other dummy variables will be added, as will be discussed below.

The first control variable captures existing economic conditions. This variable is the natural logarithm of the level of initial GDP per capita, measured in constant US dollars.

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[5] The definitions just outlined are those used by most if not all international organizations, including the World Bank (see World Bank, 2011c)

Convergence theory implies that growth rates of per capita income will eventually equalise. If convergence theory holds, the coefficient on the initial GDP per capita variable will be negative.

The second, third and fourth control variables are, respectively, domestic investment, trade (the sum of imports and exports) and FDI, each expressed as a percentage of GDP. Domestic investment relative to GDP is included given the findings of influential empirical growth studies that domestic investment is a robust determinant of economic growth (Barro, 1999, Dixon and Boswell, 1996, Levine and Renelt, 1992). The trade to GDP ratio is a proxy for the degree of openness to trade of a country. Openness is also commonly found to be an important determinant of economic growth (Frankel and Romer, 1999). FDI inflows are also recognised as an important source of capital and driver of growth in developing countries.

It is common in the literature on remittances and growth to use one or more indicators of financial market development as control variables. Indicators differ among studies. Rao and Hasson (2011) use M2 as a ratio of GDP while Alfaro *et al.* (2004) and Giuliano and Ruiz-Arranz (2009) use bank credit, commercial bank assets as a ratio of total bank assets, private sector credit and liquid liabilities as indicators of financial market development. Largely due to data availability, the fifth and sixth control variables used by this paper are domestic credit to the private sector and M2, both expressed as a percentage of GDP. Full details of these variables and the sources from which data on them has been obtained are provided in Appendix Table A2.

III. Data and Econometric Methods

Data for 136 developing countries spanning the period 1971 to 2010 are utilised. These countries include 25 SIDS. A country was considered as developing if it belonged to the World Bank low- and middle-income groups. Countries belonging to these groups were selected purely on the basis of data availability. Data are averaged over eight five-year periods, as is standard practice. This results in 694 observations, of which 133 are for SIDS. Appendix Table A3 provides a list of the SIDS included in the sample. Since averages for different periods are used, the vector $z_{i,t}$ is augmented with seven binary time dummies. We do not report results for these dummies.

Equation (2) can be estimated using the Ordinary Least Squares (OLS) method. As is standard practice, results from this estimation are reported below but they are at best illustrative, owing to concerns over the endogeneity of the remittances and other explanatory variables. While remittances might determine growth, growth rates might also determine the level of remittances. For example, migrants might respond to lower rates of economic growth in their home country by remitting more to their families in that country. Low growth

rates might also lead to higher levels of emigration and therefore remittances (Barajas *et al.*, 2009).

This leads us to the consideration of an alternative estimation method. One approach is to use instrumental variable estimation, using 'external' instruments for the remittances variable. While many studies have gone alone this path, it remains the case that suitable instruments are difficult to identify. Chami *et al.* (2003) use the ratio of a country *i* income to US income and the ratio of *i*'s real interest rate to that of the US as instruments for remittances. The World Bank (2006) used as an instrument the distance between a migrants home country and the host country. The variable was made time varying by multiplying it by measures of host country economic performance.. Barajas *et al.* (2009) use the ratio of remittances to GDP of all other recipient countries which, they argue, will capture the effects of lower transactions costs of remitting and other changes in the microeconomic determinants of remittances.. All of these studies assume that these variables are correlated with the level of remittances but not to annual GDP growth rates.

 Given these problems this paper follows the approach of Giuliano and Ruiz-Arranz (2009), which is to control for the potential endogeneity of the remittances (and other) variables with 'internal' instruments using the Generalised Method of Moments (GMM) approach. The GMM approach provides estimates that are consistent in the presence of one or more endogenous regressors. The specific variant of GMM used is a two-step system GMM proposed by Blundell and Bond (1998) and extended by Roodman (2006).[6] As is well known in the applied econometrics literature this approach uses lagged values of the endogenous regressors as instruments. It avoids, therefore, the difficulty mentioned above regarding the choice of instruments in the standard instrumental variable approach. We treat remittances, domestic investment, trade, the financial market variables, FDI and the remittances-SIDS interaction variable as endogenous. Instrument lags begin at *t*-2 and end at *t*-4. Further lags are not employed since the number of instruments would be equal to or greater than the number of country groups. Roodman (2006) shows that this yields biased results.

IV. Results

Estimates of equation (2) are shown in Table 1. We focus on those reported in columns (2) to (6), which have been obtained using GMM. All GMM specifications sh0wn in Table 2 pass the Hansen test for the validity of instruments and the Arellano-Bond AR(2) test for autocorrelation.

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[6] System GMM is preferred over the alternative – difference GMM – as the former provides more efficient results (Roodman, 2006).

Table 1: Econometric Results

		(1) OLS	(2) GMM	(3) GMM	(4) GMM	(5) GMM	(6) GMM
Constant	(α)	-0.659 (1.014)	0.683 (1.382)	0.976 (1.462)	1.464 (1.519)	0.472 (1.571)	1.627 (1.435)
SIDS	(π)	-0.973* (0.450)	-2.030* (0.659)	-1.941* (0.620)			
Pacific	(π)				-2.343* (0.634)		
Latin America & Caribbean	(π)					-1.474* (0.63)	
sub-Saharan Africa	(π)						-2.190* (0.693)
Remittances	(β)	0.016 (0.036)	-0.042 (0.031)	-0.045 (0.029)	-0.037 (0.033)	-0.045 (0.029)	-0.039 (0.033)
Remittances SIDS Interaction	(δ)	0.032 (0.051)	0.197* (0.069)	0.170* (0.080)			
Remittances Pacific Interaction	(δ)				0.169* (0.066)		
Remittances Latin America & Caribbean Interaction	(δ)					0.100 (0.129)	
Remittances sub-Saharan Africa Interaction	(δ)						0.152* (0.073)
Initial GDP per capita	(φ_1)	-0.119 (0.133)	-0.410* (0.216)	-0.391* (0.211)	-0.487* (0.244)	-0.414* (0.235)	-0.539* (0.250)
Domestic Investment	(φ_2)	0.178* (0.030)	0.168* (0.052)	0.166* (0.080)	0.156* (0.052)	0.181* (0.054)	0.162* (0.051)
Trade	(φ_3)	-0.0006 (0.004)	0.017* (0.009)	0.015 (0.009)	0.018* (0.010)	0.018* (0.009)	0.019* (0.010)
Domestic Credit	(φ_4)	0.007 (0.007)	-0.006 (0.010)				
M2	(φ_5)			-0.008 (0.007)	-0.008 (0.007)	-0.008 (0.007)	-0.007 (0.006)
FDI	(φ_6)	0.017 (0.061)	0.050 (0.089)	0.060 (0.089)	0.072 (0.098)	0.037 (0.087)	0.070 (0.097)
AR (1) (p-value)			0.00	0.00	0.00	0.00	0.00
AR (2) (*p*-value)			0.14	0.37	0.41	0.35	0.37
Hansen Test (*p*-value)			0.49	0.55	0.77	0.83	0.78
n		694	694	688	688	688	688

Numbers in parentheses are robust standard errors. * denotes significantly different from zero at the 90% or greater confidence level.

The key results are the estimates of the coefficients β and δ. Consider first those shown in columns (2) and (3). We find that there appears to be no association between per capita income growth and remittances in developing countries not classified as SIDS, based on the statistical insignificance of β. Indeed, based on all estimates of β reported in Table 2, this appears to be a reasonably robust result. This result should not come as a surprise, given the findings of much of the literature cited above. Particularly interesting are the estimates of δ reported in columns (2) and (3). In both cases δ is positive and statistically significant, which combined with the estimates of β indicates that remittances and growth in SIDS are positively associated. This result is robust with respect to a minor change in instruments, using domestic credit instead of M2 as a financial development control variable.[7] It is also robust to a number of other specifications, for which results are not provided in Table 1 but available on request.[8] The impact of remittances on growth in SIDS based on the reported estimates of β and δ, suggest that a ten percent increase in remittances is associated with an increase in per capita income growth of between 1.7 and two percent. These estimates also suggest that in the absence of remittance receipts average growth in SIDS would have been between 1.1 and 1.3 percentage points lower during the period 1971 to 2010.[9] This translates to a growth rate of between 0.67 and 0.85 percent, compared to the actual rate of 1.92 percent.

The SIDS group is homogenous in that most are islands and all have reasonably small populations. Yet they are heterogeneous in many other respects, and for this reason one cannot necessarily assume that the impact of remittances is uniform across different groups of SIDS. To investigate this issue we divide the full sample of SIDS into three geographic sub-samples, one for each of the Pacific, sub-Saharan Africa and Latin America and the Caribbean. While there will still be heterogeneity within these groups, its extent will be less than in the full sample of SIDS. Three GMM regressions are then run, in which the binary SIDS dummy is successfully replaced with dummies delineating SIDS in these regional groups from all other countries. Results are reported in columns (4) to (6) of Table 1. The positive association between remittances and growth holds for SIDS in the Pacific and sub-Saharan Africa based on the estimates of β and δ. The impact of an increase in remittances on growth for each of these groups is roughly the same as that for the SIDS group as a whole.

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[7] It is this change and corresponding data availability that accounts for the decrease in sample size reported in Table 1.

[8] These specifications include some with population size as a control variable.

[9] The without remittance receipts growth rate is calculated as $\bar{g}_i - (\hat{\beta} - \hat{\delta})\bar{r}_i$, where $\bar{g}_i$ and $\bar{r}_i$ are the average per capita GDP growth and average remittance receipts relative to GDP, respectively, of the SIDS group over the period 1971 to 2010 and $\hat{\beta}$ and $\hat{\delta}$ are the respective estimates of β and δ. In all calculations β was set to zero given its statistical insignificance in the regressions reported in Table 1.

The positive association does not hold for Latin American and Caribbean SIDS, given that for this group δ is not significantly different from zero, as shown in column (6).

That the association holds for Pacific SIDS is of particular note. These countries typically receive higher levels of remittances relative to GDP than other SIDS, and arguably face the greater economic challenges with especially low and highly volatile growth and increasing poverty incidence (AusAID, 2009, McGillivray *et al.*, 2010). Pacific SIDS achieved an average per capita GDP growth rate of 0.94 percent during 1971 to 2010. Our estimates of β and δ indicate that their remittance receipts contributed 1.68 percentage points to this growth, therefore suggesting that growth in the absence of these inflows would have been -0.74 percent.[10] While these results must by their nature be treated as suggestive, they certainly point to remittances playing a crucial role in the Pacific given the potential living standards and other consequences of negative per capita economic growth.

We do, however, pursue one line of enquiry in the current paper. As mentioned, one reason why remittances might lead to higher growth is that they reduce the level of macroeconomic volatility experienced by SIDS. If volatility is associated with uncertainty it can harm business confidence and investment, thereby contributing to lower growth. An extension of this argument is that higher growth volatility means lower growth, and that if remittances reduces the former it will increase the latter. Jackman *et al.* (2009) find that remittances have a stabilising influence on output and investment volatility using annual data for a sample of 20 SIDS. Given our speculation and this finding it is instructive to examine whether remittances have a stabilising impact on economic growth. To this end we regress remittances and the remittances-SIDS interaction variables, used to estimate equation (2) above, on the Coefficient of Variation (CV) for per capita economic growth using all countries in our dataset for which the requisite data are available.

Results are reported in Appendix Table A4. Two sets of results are reported, for a regression in which the remittances and remittances-SIDS variables are augmented with period dummies and for another in which these dummies are not used. While the coefficient on the remittance variable is not statistically significant, that attached to the interaction term is negative and statistically significant, indicating that remittances to SIDS are associated with lower growth volatility. While clearly more intensive investigation is required, the results in Table A3 suggest that one reason remittances might have had a positive impact on growth in SIDS, but not in other developing countries, is that in the former group they reduce growth volatility.

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[10] Average growth for SIDS in sub-Saharan Africa during 1971 to 2010 was 2.06 percent. Our results suggest that in the absence of remittances this growth would have been 1.32 percent.

V. Conclusion

This paper has investigated the linkage between remittance inflows and per capita income growth, paying special attention to those countries classified as Small Island Developing States (SIDS). In so doing it sought to offset a significant void in the literature on remittances, which has been blind to the impact of remittance receipts on growth in SIDS, which receive much higher levels of these inflows relative to GDP than other developing countries. The paper's investigation consisted of an econometric analysis of data for 136 developing countries, including 25 SIDS, for the period 1971 to 2010. The paper found no evidence that per capita income growth would be lower in developing countries not classified as SIDS. In contrast, it found a positive, statistically significant association between growth in and remittances to SIDS. This association was such that the impact of a ten percent increase in remittances to these countries yields as much as two additional percentage points in economic growth. It also found that this result held for SIDS located in the Pacific and sub-Saharan Africa, but not those in Latin America and the Caribbean. Growth in Pacific SIDS was found to be substantially lower in the absence remittance inflows. These countries grew on average by 0.94 percent during 1971 to 2010. Our results suggest that without remittances these countries would have recorded an average growth rate of -0.74 percent during this period.

That per capita income growth in SIDS would be lower in the absence of remittance inflows is a useful finding to the extent that it justifies the widely-embraced policy stance that remittances are important and that efforts ought to be taken to achieve higher levels of them. But it is of limited use in devising efforts to increase the growth impacts of remittances to SIDS, or to learn lessons from SIDS that might be transferred to other countries. What is needed from these perspectives is knowledge of how remittances inflows have driven higher growth in SIDS, or the channels or mechanisms through which this outcome has arisen. This is an important priority for future research given expected future levels of remittances and the many hopes attached to them.

Appendix

Figure A1: Remittances, FDI, and Official Flows to Developing Countries, 1971-2010 (constant prices 2005 = 100)
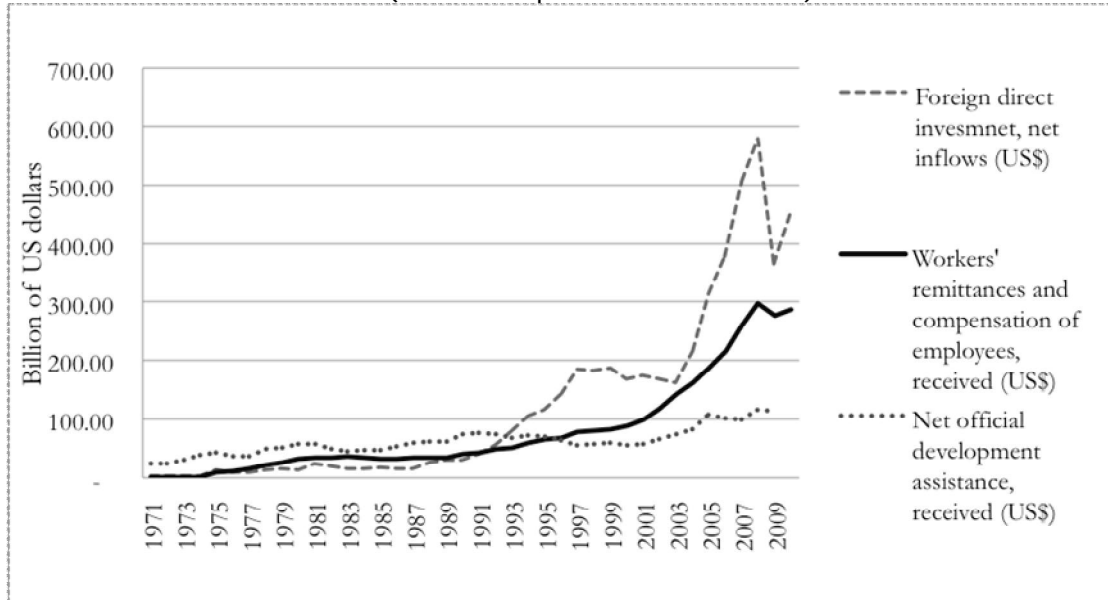
Source of data: (World Bank, 2011b).

Table A1: Flows of Remittances to SIDS

Country Group	Ratio of Workers' Remittances and Compensation to GDP (%)		
	1980-1989	1990-1999	2000-2009
SIDS			
Caribbean			
Antigua and Barbuda	3.96	2.21	2.59
Barbados	1.23	3.30	4.30
Belize	7.94	3.23	4.35
Dominica	10.90	5.58	7.12
Dominican Republic	3.49	5.27	8.64
Grenada	11.41	9.77	10.28
Haiti	-	-	21.73
Jamaica	3.94	8.05	14.54
St. Kitts and Nevis	5.52	7.21	7.88
St. Lucia	5.33	3.68	3.48
St. Vincent and the Grenadines	9.81	5.68	5.99
Trinidad and Tobago	0.05	0.44	0.57
sub-Saharan Africa			
Cape Verde	14.43	18.02	12.67
Comoros	2.58	5.54	3.62
Guinea-Bissau	0.74	0.96	5.27
Mauritius	-	3.78	3.47
Sao Tome and Principe	-	-	1.25
Seychelles	1.38	0.69	0.90
Latin America			
Guyana	0.44	1.26	12.94
Suriname	0.43	0.36	1.31
Asia			
Maldives	1.55	0.56	0.30
Pacific			
Fiji	1.45	1.55	5.05
Kiribati	12.39	12.07	7.65
Papua New Guinea	0.24	0.34	0.17
Samoa	28.16	24.50	21.65
Solomon Islands	-	0.49	0.98
Tonga	21.06	16.50	29.78
Vanuatu	6.63	7.55	4.16
SIDS Average	6.46	5.86	7.23
Pacific SIDS Average	11.66	9.00	9.92
Low-Middle Income Countries	1.18	1.21	1.84
World	0.40	0.39	0.63

Data are from the World Bank (2011b).

Table A2: Variable Descriptions and Sources

Variable	Description	Source
Growth	Annual growth in real GDP per capita, expressed as a percentage.	World Bank (2011b)
Remittances	Workers' remittances and compensation of employees (received) as a percentage of country GDP	World Bank (2011b)
Initial GDP per capita	Natural logarithm of the level of GDP per capita in constant $US	World Bank (2011b)
Domestic investment	Gross fixed capital formation percentage of GDP.	World Bank (2011b)
Trade	Trade is the sum of exports and imports of goods and services measured as a percentage of GDP	World Bank (2011b)
Financial market	Domestic credit to the private sector as a percentage to GDP. Domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of no equity securities, and trade credits and other accounts receivable, which establish a claim for repayment. For some countries these claims include credit to public enterprises.	World Bank (2011b)
M2	Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2. It is measured as a percentage to GDP.	World Bank (2011b)
FDI	FDI inflows as a percentage of host country GDP	World Bank (2011b)

Table A3: SIDS included in Sample

Antigua and Barbuda	Mauritius
Barbados	Papua New Guinea
Belize	Samoa
Cape Verde	Seychelles
Comoros	Solomon Islands
Dominica	St. Kitts and Nevis
Dominican Republic	St. Lucia
Fiji	St. Vincent and the Grenadines
Grenada	Suriname
Guinea-Bissau	Tonga
Guyana	Trinidad and Tobago
Jamaica	Vanuatu
Maldives	

Table A4: Impact of Remittances on Growth Volatility

	(1)	(2)
Constant	520.991*	112.173
	(201.313)	(103.719)
Remitttances	-13.887*	-14.362
	(7.902)	(8.780)
Remittances SIDS	-22.415*	-23.481*
Interaction	(10.604)	(11.424)
Period dummies	No	Yes
N	966	966

Numbers in parentheses are robust standard errors.
* denotes significantly different from zero at the 90%
or greater confidence level.

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